

Reg. No. :

Question Paper Code : 21135

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

First Semester

Civil Engineering

PH 8151 — ENGINEERING PHYSICS

(Common to All branches)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Hooke's law of elasticity.
2. What are I-shaped girders?
3. What is stimulated emission?
4. List the conditions to be satisfied for total internal reflection.
5. Define coefficient of thermal conductivity.
6. Can Lee's disc method be used for good conductors? Justify.
7. In a Compton scattering experiment the incident photons have a wavelength of 3Å . What is the wavelength of the scattered photons if they are viewed at an angle of 60° to the direction of incidence.
8. Give the significance of the wave function.
9. Define unit cell.
10. What are Miller indices?

PART B — (5 × 16 = 80 marks)

11. (a) Derive an expression for the period of oscillation of a torsion pendulum. How it will be used to determine rigidity modulus of a wire? (16)

Or

- (b) Describe with necessary theory, the method to determine the Young's modulus of the beam by uniform bending. (16)

12. (a) (i) Discuss the Einstein's theory of stimulated emission and obtain the expression for the ratio of the spontaneous to simulated emission coefficients. (10)
(ii) Explain working of any one type of fiber optic displacement sensor. (6)

Or

- (b) Describe the classification of optical fibers based on material, refractive index profile and propagation modes. (16)

13. (a) Describe Forbes' method to determine the thermal conductivity of a conductor in the form of a long bar. (16)

Or

- (b) (i) What is heat exchanger? Explain in detail about heat exchangers. (10)
(ii) Write a note on Solar water heaters. (6)

14. (a) Derive an expression for Plank's radiation law and discuss the same for shorter and longer wavelengths. (16)

Or

- (b) (i) Solve Schrodinger wave equation for a particle in a one dimensional box and obtain the energy eigen values. (10)
(ii) Explain the working of scanning tunneling microscope. (6)

15. (a) Explain the physical basis for classifying crystals into seven systems and fourteen Bravais lattices. (16)

Or

- (b) (i) Determine the coordination number and packing density for a hexagonally closed packed structure. Show that a HCP structure demands an axial ratio of 1.633. (12)
(ii) Explain about any two point defects with neat diagram. (4)